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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,021	05/11/2006	Geoffrey Spence	06-345	3888

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EXAMINER

BARBEE, MANUEL L

ART UNIT	PAPER NUMBER
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2857

MAIL DATE	DELIVERY MODE
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10/10/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/579,021

Applicant(s)

SPENCE ET AL.

Examiner

Manuel L. Barbee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-9, 12-20, 23-31 and 34 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 21, 22, 32 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/21/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 6-9, 12, 17-20, 23, 28-31 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,959,966 to Torkkola (Torkkola).

As per claims 34, 12 and 23:

With regard to processing pairs of windows and processing each following window using results obtained in connection with the respective leading window to implement separate initialization of orthogonality and independence of signals associated with the following window and obtain approximate results for the following window, Torkkola teaches using a sliding window to process samples and using the separation matrix from the first window as an initial value in the second sample window (col. 11, line 60 - col. 2, line 30). With regard to processing the approximate results to achieve signal separation, Torkkola teaches a separation matrix (col. 11, line 60 - col. 12, line 30).

As per claims 6, 17 and 28:

With regard to an acquisition phase in which signals are separated and desired signals are identified and a subsequent phase in which only desired signals are

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processed to separation, Torkkola teaches removing the components of other mixed signals to recover a source signal (col. 4, lines 1-12).

As per claims 7, 18 and 29:

With regard to statistical measures of data, Torkkola teaches a separation matrix (col. 11, line 60 - col. 12, line 30).

As per claims 8, 19 and 30:

With regard to processing a first leading window and processing following windows by iteratively updating immediately preceding results using subsequent data snapshots to produce snapshot results and combining the snapshot results with the immediately preceding results that are obtained in a respective immediately preceding update, Torkkola teaches using a sliding window to process samples and using the separation matrix from the first window as an initial value in the second sample window (col. 11, line 60 - col. 12, line 30).

As per claims 9, 20 and 31:

With regard to a forget factor to implement fading in the following window, Torkkola teaches keeping up with fading corresponding to the speed of the transmitter and the receiver (col. 11, line 60 - col. 12, line 30).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2, 3, 13, 14, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torkkola in view of "Characteristic-function-based independent Component Analysis" in Signal Processing, October 2003, Vol. 83, No. 10 by Eriksson et al. (Eriksson).

Torkkola teaches all the limitations of claim 34 upon which claims 2 and 3 depend, claim 12 upon which claims 13 and 14 depend and claim 23 upon which claims 24 and 25 depend.

As per claims 2, 13 and 24:

Torkkola does not teach updating orthogonality using small updates to produce decorrelation in a second order statistics procedure. Eriksson teaches a Jacobi type optimization to produce independent sources and optimizing orthogonality (p 2201, Section 4 and 4.1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blind separation, as taught by Torkkola, to include Jacobi-type orthogonal optimization, as taught by Eriksson, because then the objective function would have been minimized using computationally convenient expressions (Eriksson, p 2210, Section 4).

As per claims 3, 14 and 25:

Torkkola does not teach a technique referred to as Jacobi and involving diagonalisation of a symmetric matrix by determining and applying rotations iteratively until off-diagonal elements of the matrix become substantially equal to zero. Eriksson teaches a Jacobi type optimization to produce independent

sources and optimizing orthogonality (p 2201, Section 4 and 4.1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blind separation, as taught by Torkkola, to include Jacobi-type orthogonal optimization, as taught by Eriksson, because then the objective function would have been minimized using computationally convenient expressions (Eriksson, p 2210, Section 4).

5. Claims 5, 6, 15, 16, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torkkola in view of Eriksson as applied to claims 3, 14 and 25 above, and further in view of US Patent Application Publication 2001/0044719 to Casey (Casey).

Torkkola and Eriksson teach all the limitations of claim 3 upon which claims 4 and 5 depend, claim 14 upon which claims 15 and 16 depend and claim 25 upon which claims 26 and 27 depend.

As per claims 4, 15 and 26:

With regard to using results obtained for each leading window to initialize independence of decorrelated signals associated with the respective following window in a second stage using independent component analysis to apply small rotation updates to initialise signals, Eriksson further teaches a Jacobi type optimization to produce independent sources and optimizing orthogonality (p. 2201, Section 4 and 4.1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blind separation, as taught by Torkkola, to include Jacobi-type orthogonal optimization, as taught by

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Eriksson, because then the objective function would have been minimized using computationally convenient expressions (Eriksson, p. 2210, Section 4).

Torkkola and Eriksson do not teach higher than second order statistics. Casey teaches cumulative expansions up to the fourth order (par. 39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blind separation combination, as taught by Torkkola and Eriksson, to include expansions up to the fourth order, as taught by Casey, because then features would have been extracted from recorded signals (Casey par. 39).

As per claims 5, 16 and 27:

Torkkola and Eriksson do not teach third or fourth order statistics procedure.

Casey teaches cumulative expansions up to the fourth order (par. 39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the blind separation combination, as taught by Torkkola and Eriksson, to include expansions up to the fourth order, as taught by Casey, because then features would have been extracted from recorded signals (Casey par. 39).

Allowable Subject Matter

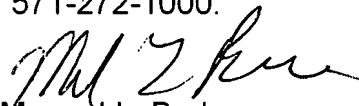
6. Claims 10, 11, 21, 22, 32 and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manuel L. Barbee whose telephone number is 571-272-2212. The examiner can normally be reached on Monday-Friday from 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on 571-272-7925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Manuel L. Barbee
Examiner
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mlb
September 29, 2007